

A NEW POPULAR STAR ATLAS

(EPOCH 1950)

16 MAPS

Covering the whole Heavens, and showing Stars
down to Magnitude $5\frac{1}{2}$, also Nebulae visible in
field glasses; with descriptive lists of selected
Interesting Objects relative to each Map.

BY

R. M. G. INGLIS

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1974

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FOREWORD

THIS Atlas is intended for those observing with the naked eye, or aided only by binocular or a very small telescope. It has been designed to be of an intermediate character to simple Star Maps which give the general aspect of the night sky from month to month, and much fuller Maps constructed for those who wish to find and examine in the telescope celestial objects in more detail. "Norton's Star Atlas" (Gall and Inglis) is a work of this latter class.

This new Popular Atlas shows stars down to magnitude $5\frac{1}{2}$, which are clearly visible to the unaided sight, and includes only those variable stars which, at times, become visible to the naked eye. Only those nebulae and clusters which are visible without optical aid, or in field glasses, are included. In order to make the Maps as clear and simple as possible, only those other stars, commonly designated by a number, which are of brighter mag. than 5th, or are of particular interest in small telescopes, have, as a general rule, been included.

The short lists of objects are similarly selected. These, and the list of star names are extracts from "Norton's Star Atlas," by courtesy of the Author, who drew the Maps for this present work.

The Constellation Boundaries, indicated by broken lines, are those now generally accepted.

The Maps are drawn for the Epoch 1950 A.D., and will therefore be sufficiently accurate for the purpose for which they are designed, until the end of the present century.

A Star is sometimes named, but more frequently it is indicated by a Greek or other letter or number followed by the genitive case of the Latin name of the Constellation to which it belongs. Thus the Pole Star or *Polaris* is known as α Ursae Minoris. For the genitives refer to the List of Constellations at the end of this book. The Greek alphabet is also given for reference.

The position of a star on the star sphere is fixed by its Right Ascension and Declination, just as the position of a place on the Earth is known by its longitude and latitude.

Right Ascension (R.A.) is reckoned in hours, minutes, and seconds from 0^h to 24^h (which are the same) and is measured eastward, or counter clockwise, along the equator.

Declination (Dec.) is the angular distance of a celestial body north (+) or south (−) of the celestial equator. Thus in Map 5, the place of *Capella*, α Aurigae, is approximately:—
R.A. $5^h 13^m$ Dec. $+46^\circ$. The marginal divisions between the hours of R.A. mark intervals of 10 minutes.

Variable Stars. Bright ones are marked with a small V, others by small circles.

Nebulae. Those marked with a number preceded by an M are from Messier's list. Those having a number only are from the New General Catalogue (N.G.C.) of Herschel and Dreyer.

Magnitude (mag.) indicates the apparent brightness of a star. From earliest times stars visible to the naked eye have been classified into six magnitudes, mag. 1 representing really bright stars and mag. 6 the faintest visible to the average unaided eye. In the modern scale of magnitudes there are only a few stars of actual Mag. 1; those which are brighter than these ranging from Mag. 0, -0 , -1 , to Mag. -1.6 , which is that of *Sirius*, the brightest fixed star in the heavens. Each magnitude is divided into tenths, and in cases of extreme accuracy into hundredths.

MAPS 1 AND 2.

All the stars shown on these two Maps, with the exception of those near the bottom corners, are *circumpolar* as seen from the latitude of the British Isles, i.e., they never set and so are visible on any clear night.

First find the well-known seven stars of Ursa Major or the Great Bear. At 9 p.m. in early November this constellation will be found low down near the northern horizon, and in May nearly overhead. In February, at the same hour, it will be found "standing on its tail," half-way up from the N.E. point of the horizon to the point overhead, and in August at the same distance above the N.W. horizon.

The stars β and α of Ursa Major are known as the Pointers, because a straight line from β to α continued for about five times the distance between the two stars nearly marks the position of the North Pole of the heavens. About a degree, or two moon-breadths, distant from the Pole is the Pole Star or *Polaris*, a 2nd mag. star with a 9th mag. attendant at 18" distance, to be seen in a 2-inch telescope.

A straight line from Ursa Major to the Pole Star, continued beyond the Pole to an equal distance reaches Cassiopeia, a group of stars in the form of a W. When Ursa Major is high in the heavens, Cassiopeia is low down in the north, and vice versa.

MAP 1.

| | R.A. | Dec. | |
|--------------------------------|-----------------------------------|-------|---|
| ζ Ursae Majoris. | 13 ^h 22 ^m , | +55°. | A 2nd mag. star, the middle one of the Bear's tail, is named <i>Mizar</i> , and forms a naked-eye pair with the 5th mag. star <i>Alcor</i> . In a small telescope a closer 4th mag. star 15" distant may be seen. |
| ϵ Bootis. | 14 ^h 14 ^m , | +52°. | Near the end of the tail of the Great Bear is a little triangle of stars. The second of these is double, being composed of stars of the 5th and 7th mag. at a distance apart of 38". The leader κ is also double, but closer at 13". |
| ι and κ Draconis. | 16 ^h 35 ^m , | +53°. | γ and β <i>Draconis</i> point, at about double their distance, to these 5th mag. stars 90" apart, so easily seen in binoculars. |
| ν Draconis. | 17 ^h 31 ^m , | +55°. | N. of β , is an easy object consisting of two 4½ mag. stars at 62" distance. |
| ψ Draconis. | 17 ^h 43 ^m , | +72°. | Half-way between ν and the Pole star is a triangle of stars. The leader is of the 4th mag. and has a 5th mag. companion 31" distant. |

MAP 2.

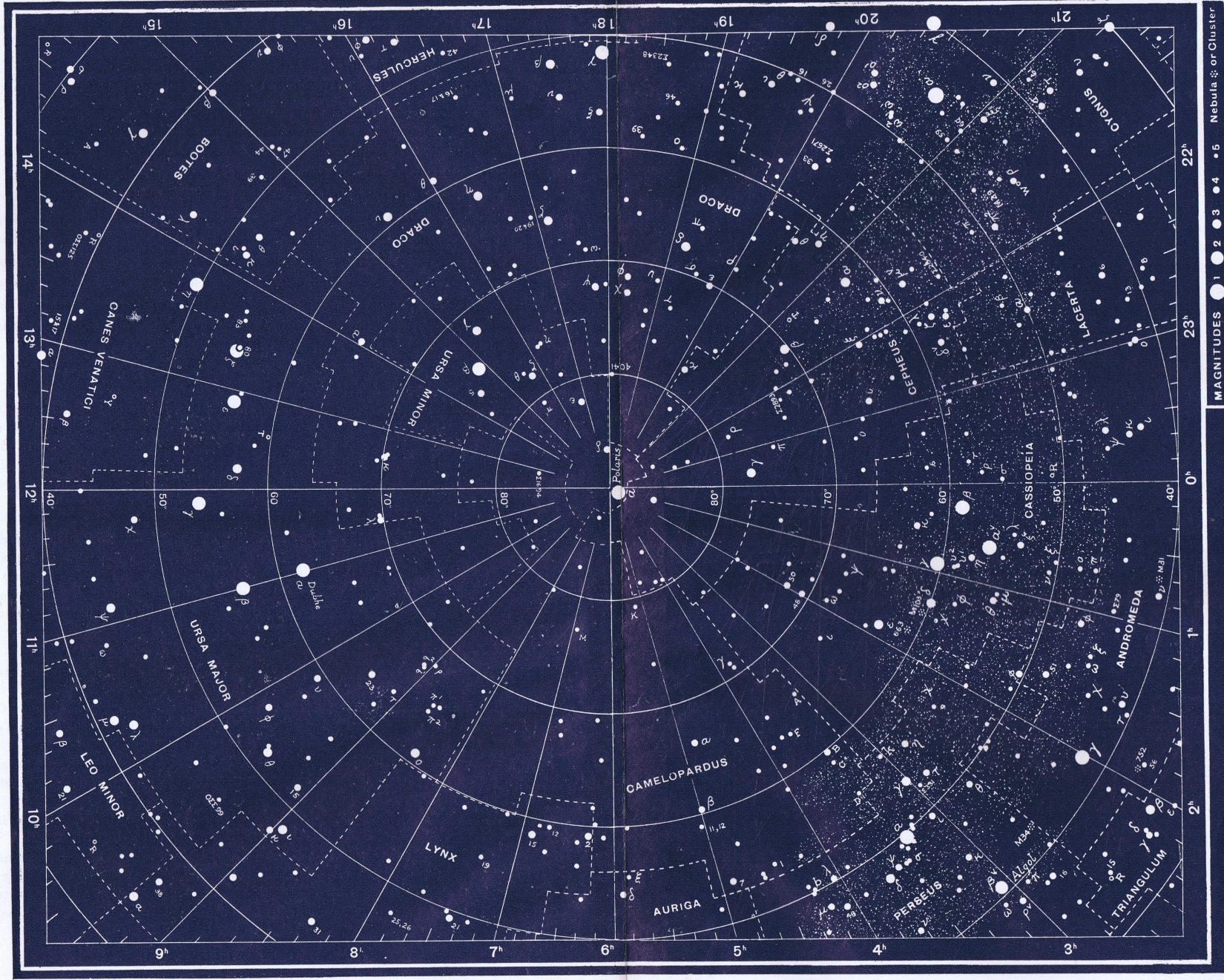
| | | | |
|--------------------------------|-----------------------------------|-------|---|
| α and β Draconis. | 18 ^h 4 ^m , | +80°. | Nearly half-way from ψ Draconis to the Pole Star. Two yellow stars of mags. 5½ and 6 with distance 20". |
| 16 Cygni. | 19 ^h 41 ^m , | +50°. | Is about 5° North of δ , and closely following θ Cygni. It is a double star, with components of 5 and 5½ mag., at a distance apart of 38". Best found by the aid of Map 13. |
| δ Cephei. | 22 ^h 27 ^m , | +58°. | Follows ζ , and is a ruddy star which varies in magnitude from 3½ to 4½ in a period of 5½ days. It has a companion star of the 7th mag. 41" distant. |
| M 103. | 1 ^h 30 ^m , | +60°. | Follows δ Cassiopeia, a little to the N. of it, and is a cluster containing several stars of the 7th to the 9th mag. |
| χ Persei. | 2 ^h 17 ^m , | +57°. | A line from γ to δ Cassiopeia produced to about twice their distance reaches what appears to the eye as a hazy patch. In a small telescope or in binoculars it is resolved into two grand clusters of stars—one of the finest objects in the heavens. |

See Map 11

See Map 13

MAP 1

See Map 9



See Map 3

MAP 2

See Map 7

See Map 5

MAPS 3 AND 4.

The Central Hour of R.A. is South at:—
8 p.m. on Nov. 21; 10 p.m. on Oct. 21; Midnight on Sept. 21

Cassiopeia is nearly overhead, the Great Square of Pegasus (α , β , γ with α Andromedae) is well up in the South, and low down near the horizon is *Fomalhaut*, the chief star of Piscis Austrinus.

MAP 3.

| | R.A. | Dec. | |
|------------------------|-----------------------------------|-------|--|
| π Pegasi. | 22 ^h 8 ^m , | +33°. | Two yellow stars of 4½ and 5th mag., form a wide and beautiful pair. |
| 8 Lacertæ. | 22 ^h 34 ^m , | +39°. | A 6th mag. star, having a 6½ mag. attendant at 22" distance. |
| R Andromedæ. | 0 ^h 21 ^m , | +38°. | Follows θ , and is a variable star visible to the naked eye at its maximum mag. of 5½. It falls to 14th mag. at minimum. |
| M 31. | 0 ^h 40 ^m , | +41°. | The Great Nebula in Andromeda, near ν , appears as a misty spot to the unaided sight, and as an oval structureless nebula in small telescopes. Photographs show that it is an immense spiral. It is probably an island universe about 800,000 light years distant from us. |
| ψ^1 Piscium. | 1 ^h 3 ^m , | +21°. | The uppermost of a small group of stars; is a fine double star and an easy object in a small telescope. Each star is of 5½ mag., and the distance between them is 30". |
| ζ Piscium. | 1 ^h 11 ^m , | +7°. | Is almost on the Ecliptic, and consists of a fixed pair of stars of the 4th and 5th mag., 24" apart. |
| ρ and 94 Piscium. | 1 ^h 24 ^m , | +19°. | These form a naked eye pair of 5th mag. stars. |
| γ Arietis. | 1 ^h 51 ^m , | +19°. | A beautiful fixed pair of 4th mag. stars, the distance between them being 8½". They were discovered by Hooke in 1664. |
| λ Arietis. | 1 ^h 55 ^m , | +23°. | A fine double star preceding α . A white 5th mag. star having an 8th mag. bluish attendant at 38" distance. |
| N.G.C. 752. | 1 ^h 55 ^m , | +37°. | About 5° south of γ Andromedæ is an unusually large open cluster, just visible to the naked eye. |

MAP 4.

| | | | |
|--------------------------|-----------------------------------|-------|--|
| ζ Aquarii. | 22 ^h 26 ^m , | -0°. | Just south of the Equator; a fine binary pair. Two nearly equal 4th mag. stars at 2½" distance. A test for a 2-inch telescope. |
| β Piscis Austrini. | 22 ^h 29 ^m , | -33°. | A double star consisting of a 4½ mag. star with an 8th mag. companion at 30" distance. |
| 94 Aquarii. | 23 ^h 16 ^m , | -14°. | A yellowish 5th mag. star with a 7th mag. blue star 13" distant. |
| 107 Aquarii. | 23 ^h 43 ^m , | -19°. | A double star. Mags. 5½ and 6½. The components are about 6" apart. |
| 37 Ceti. | 1 ^h 12 ^m , | -8°. | Preceding θ is a wide (50") double star, consisting of a 5th mag. star, with a 7½ mag. attendant. |



MAGNITUDES 1 2 3 4 5 Nebula ✨ or Cluster

MAPS 5 AND 6.

The Central Hour of R.A. is South at:—

8 p.m. on Jan. 21; 10 p.m. on Dec. 21; Midnight on Nov. 21

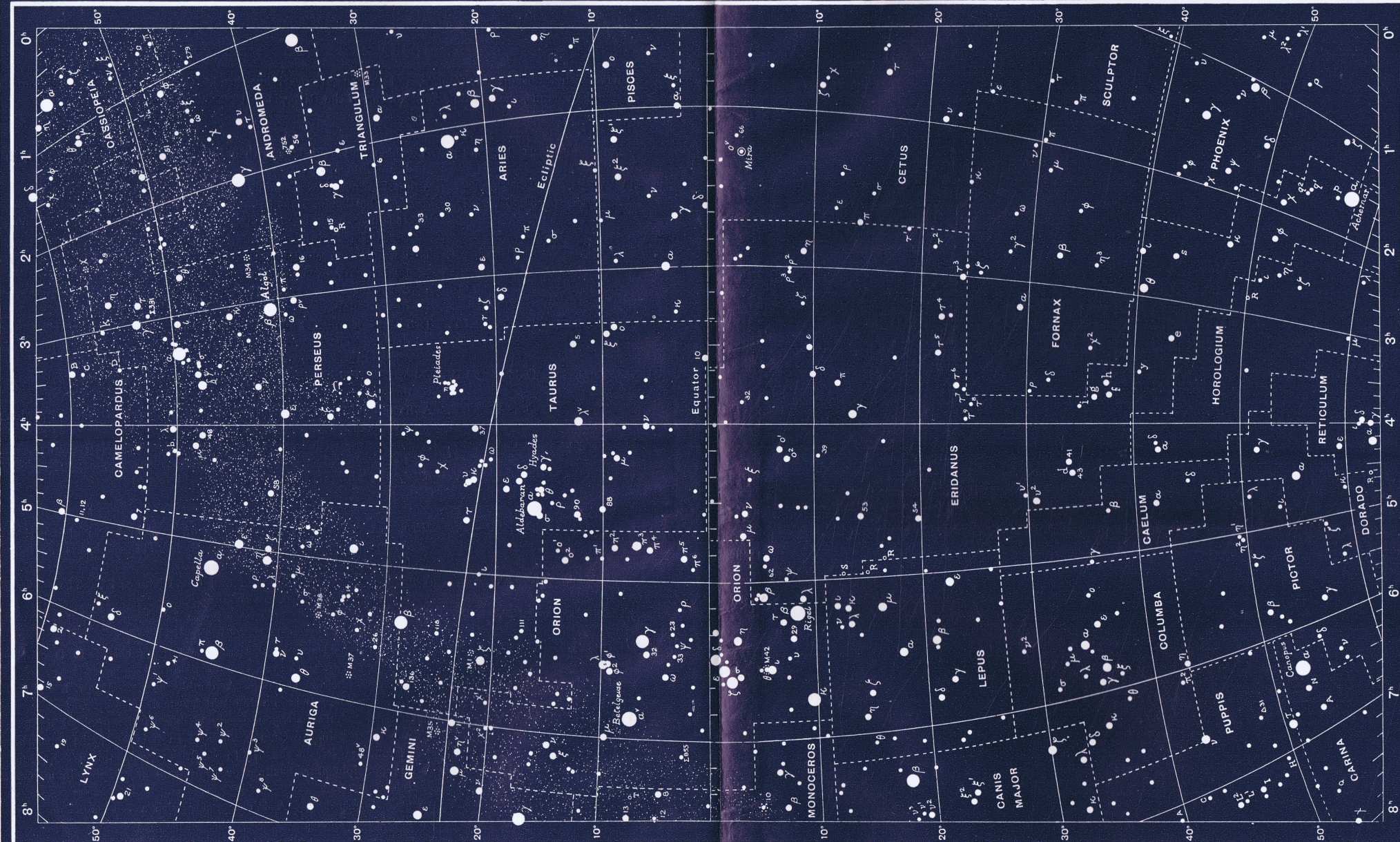
Auriga with its bright star *Capella*, and Perseus are nearly overhead. Orion is approaching the south, and Eridanus, the winding constellation of the River, is best placed for observation.

MAP 5.

| | R.A. | Dec. | |
|---------------------|----------------------------------|--------|---|
| γ Andromedæ. | 2 ^h 1 ^m , | + 42°. | A golden 2nd mag. star with a 5th mag. blue star, 10" distant, in beautiful contrast. |
| 30 Arietis. | 2 ^h 34 ^m , | + 24°. | A double star. Mags. 5½ and 6½. Distance 39". |
| β Persei. | 3 ^h 5 ^m , | + 41°. | <i>Algol</i> . The Demon Star of the Ancients. A remarkable variable star. It is usually of the 2nd mag., but regularly fades to mag. 3½. The times of its minimum brilliancy are given in Whitaker's Almanac. |
| The Pleiades. | 3 ^h 44 ^m , | + 24°. | This well-known cluster in Taurus consists of 6 or 7 stars as seen by ordinary eyes, though persons with keener sight can detect 2 or 3 or other stars. It is best viewed with very low power or in binoculars. |
| θ Tauri. | 4 ^h 26 ^m , | + 16°. | Two stars of mags. 4 and 4½ and 337" apart appear as a naked eye double. These stars form a part of the V-shaped open cluster of stars near <i>Aldebaran</i> known as the <i>Hyades</i> . |
| σ Tauri. | 4 ^h 36 ^m , | + 16°. | Following <i>Aldebaran</i> and somewhat to the S. of it, is also a naked eye double formed by two 5th mag. stars 430" apart. |
| τ Tauri. | 4 ^h 39 ^m , | + 23°. | A fixed double star. A 5th mag. star with a 7th mag. companion 63" distant. |
| 14 Aurigæ. | 5 ^h 12 ^m , | + 33°. | A double star with components of mags. 5 and 7, relatively fixed at 15" distance. |
| α Orionis. | 5 ^h 53 ^m , | + 7°. | <i>Betelgeuse</i> , a bright, ruddy, irregular variable star. |

MAP 6.

| | | | |
|-------------------|----------------------------------|--------|---|
| α Ceti. | 2 ^h 17 ^m , | - 3°. | <i>Mira</i> . A remarkable variable star of long and irregular period. At maximum brightness it may reach 2nd mag., but is generally less. At minimum it is 10th mag. |
| 32 Eridani. | 3 ^h 52 ^m , | - 3°. | A fixed double star. Mags. 4 and 6. Distance 7". The colours, topaz and light green, are striking. |
| β Orionis. | 5 ^h 12 ^m , | - 8°. | <i>Rigel</i> . This bright 1st mag. star has a 7th mag. companion at 9½" distance. It is a good test for a 2-inch telescope. |
| δ Orionis. | 5 ^h 29 ^m , | - 0°. | The first of the three stars that form Orion's belt. It is of the 2nd mag. with a 7th mag. star 53" distant. |
| α Leporis. | 5 ^h 31 ^m , | - 18°. | Immediately below Orion. A double star. Mags. 4 and 9½. Distance 35". It is in a fine field for small telescopes. |
| M 42. Orionis. | 5 ^h 33 ^m , | - 5°. | The Great Nebula in Orion, easily visible to the unaided sight as a hazy spot in the Giant's Sword. In it is θ Orionis, consisting of four stars from the 6th to the 8th mag., forming a Trapezium |
| σ Orionis. | 5 ^h 36 ^m , | - 3°. | A fine multiple star. Three or four stars are visible in a small telescope. |
| γ Leporis. | 5 ^h 42 ^m , | - 22°. | An easy double star. A 4th mag. star with a 7th mag. companion at 94" distance. |



MAPS 7 AND 8.

The Central Hour of R.A. is South at:—

8 p.m. on Mar. 22; 10 p.m. on Feb. 20; Midnight on Jan. 21

The Constellation Gemini with its conspicuous stars *Castor* and *Pollux* is high up in the South. Below it is the bright star *Procyon* situated at one corner of a large equilateral triangle formed by *Betelgeuse*, *Procyon*, and *Sirius*—the brightest fixed star. The sickle of Leo is in the south-east.

MAP 7.

| | R. A. | Dec. | |
|-----------------------|----------------------------------|--------|--|
| M35 in Gemini. | 6 ^h 6 ^m , | + 24°. | This is a fine loose cluster of stars very unequal in magnitude. It follows 1 Geminorum about 1° to the N. of the star, and is just visible to the naked eye. |
| 8 Monocerotis. | 6 ^h 21 ^m , | + 5°. | A yellow 4th mag. star with a bluish 6½ mag. companion at 13" distance. This is in a grand low-power field. |
| N.G.C. 2244. | 6 ^h 30 ^m , | + 5°. | Includes 12 Monocerotis. A beautiful loose cluster with many 7th and 9th mag. stars. |
| ζ Geminorum. | 7 ^h 1 ^m , | + 21°. | A 4th mag. variable star, with a 7th mag. star at 96" distance. |
| M44 in Cancer. | 8 ^h 37 ^m , | + 20°. | The <i>Praesepe</i> . This large cluster lies about half way between γ and δ which it slightly precedes. It is easily seen with the naked eye, and is almost resolvable into stars without instrumental aid. A fine object for a small telescope with low power, or in binoculars. |
| ε Cancrī. | 8 ^h 44 ^m , | + 29°. | A yellow 4th mag. star beautifully contrasted with a blue 6½ mag. star at 31" distance. It follows <i>Pollux</i> by about 1 hour. |
| OSΣ 99 Ursae Majoris. | 9 ^h 25 ^m , | + 46°. | Is at the corner of a triangle with θ and κ. A 5½ mag. yellow star with an 8th mag. companion at a distance of 82". |

MAP 8.

| | | | |
|-------------------------|----------------------------------|--------|--|
| N.G.C. 2232. | 6 ^h 26 ^m , | - 5°. | An open cluster, visible to the naked eye, includes 10 Monocerotis. |
| β, 11. Monocerotis. | 6 ^h 26 ^m , | - 7°. | A triple star consisting of a 5th mag. star with a 5½ mag. star at 7½" distance, and a 6th mag. star 10" distant. |
| M41 in Canis Major. | 6 ^h 45 ^m , | - 21°. | A grand, loose cluster of stars, just visible to the naked eye. It lies about 4° below Sirius, and is thus easily found. |
| κ Puppis. | 7 ^h 37 ^m , | - 27°. | A double star consisting of two 4½ mag. stars, 10" apart. |
| γ Velorum. | 8 ^h 8 ^m , | - 47°. | A 2nd mag. star with a 6th mag. companion 42" distant. An 8th mag. star is present at 63" distance from the chief star. |
| ζ ¹ Antliae. | 9 ^h 29 ^m , | - 32°. | Is pointed at by ψ Velorum and ε Antliae. It is a double star with components of 6th and 6½ mag., 8" apart. |



MAPS 9 AND 10.

The Central Hour of R.A. is South at:—

8 p.m. on May 22; 10 p.m. on April 22; Midnight on Mar. 22

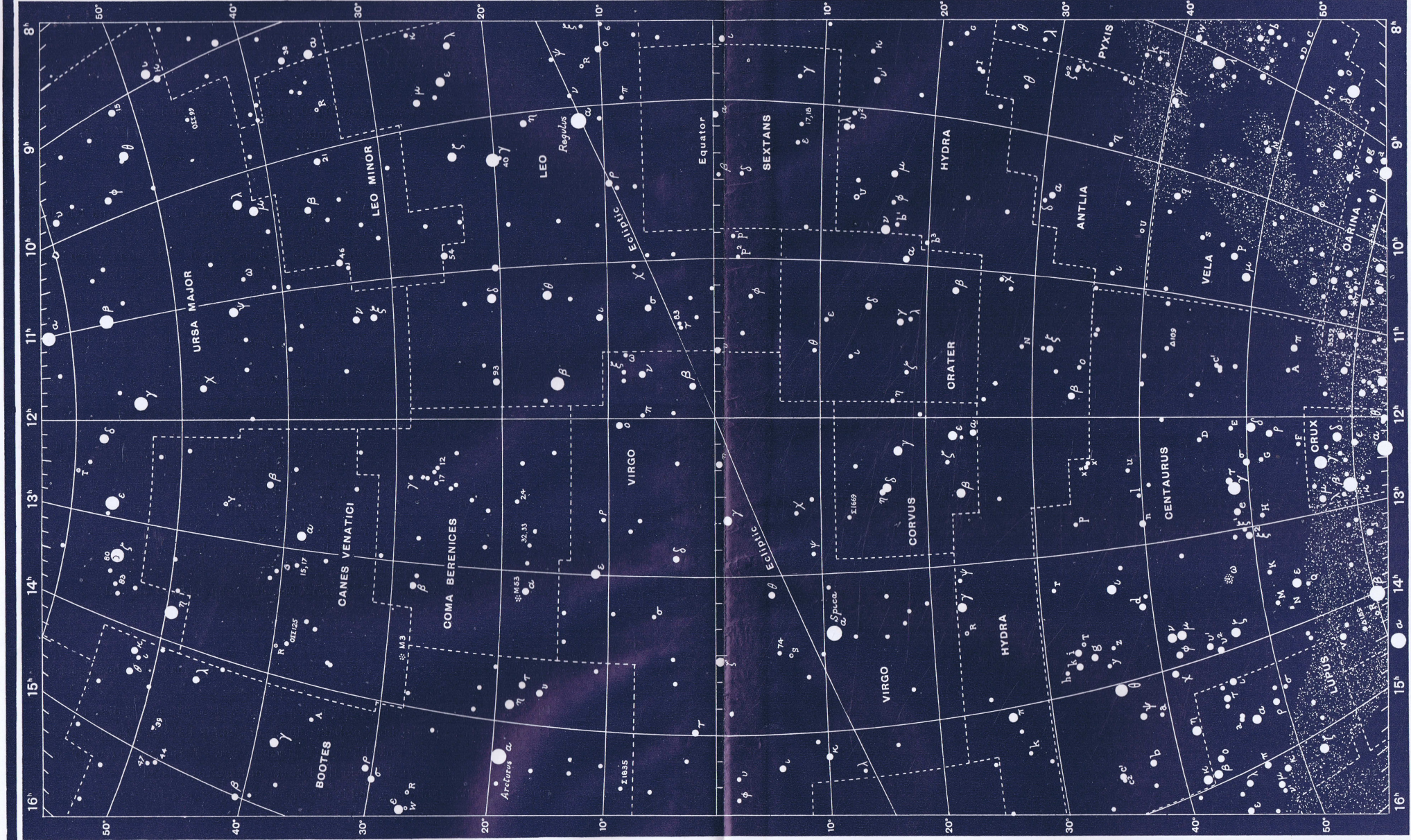
The seven principal stars of Ursa Major are overhead. Leo and Virgo are well placed for observation, as are Crater and Corvus south of the Equator.

MAP 9.

| | R.A. | Dec. | |
|----------------------------------|---------------|---------------|--|
| τ Leonis. | $11^h 25^m$, | $+3^\circ$. | A wide, double star, with components of the 5th and 7th mag., at 92" distance apart. |
| 83 Leonis. | $11^h 24^m$, | $+3^\circ$. | Closely precedes τ slightly to the N. of it. The stars which form the double are of the 6th and 7th magnitude, their distance 29". |
| 93 Leonis. | $11^h 45^m$, | $+20^\circ$. | About $5\frac{1}{2}^\circ$ N. of β . The chief star of mag. $4\frac{1}{2}$ has an 8th mag. companion at 74" distance. |
| 24 Comae Berenice. | $12^h 33^m$, | $+19^\circ$. | A double star, consisting of a 5th mag. yellow star, with a 6th mag. white star 20" distant. |
| 32 and 33 Comae Ber. | $12^h 50^m$, | $+17^\circ$. | Of mags. $5\frac{1}{2}$ and 6 respectively, and 195" apart, are easily separated with the slightest optical aid. |
| α , 12 Canum Venaticorum. | $12^h 54^m$, | $+39^\circ$. | <i>Cor Caroli</i> . This star, though only of the 3rd mag., is prominent as there are no bright stars in the vicinity. It lies about 18° S. of ϵ Ursae Majoris, and has a $5\frac{1}{2}$ mag. companion at 20" distance. |
| M53. | $13^h 11^m$, | $+18^\circ$. | A fine globular cluster just visible to the naked eye. It closely follows α Comae Berenice about $\frac{1}{2}^\circ$ to the N. of the star. |
| M3. | $13^h 40^m$, | $+29^\circ$. | A brilliant globular cluster of stars near the lower boundary of Canes Venatici. It lies almost half-way between <i>Arcturus</i> and α Canum Venaticorum. |
| τ Virginis. | $13^h 59^m$, | $+2^\circ$. | A 4th mag. star with a 9th mag. companion 80" distant. |

MAP 10.

| | | | |
|--------------------|---------------|---------------|--|
| N Hydrae. | $11^h 30^m$, | -29° . | About 2° above ζ , consists of two 6th mag. stars having a common proper motion and 9" distance. |
| δ Corvi. | $12^h 27^m$, | -16° . | A third mag. star with a 8th mag. attendant at 24" distance. |
| ω Centauri. | $13^h 24^m$, | -47° . | The finest globular cluster of stars in the sky. To the unaided eye it looks like a hazy 4th mag. star. It is situated too far south to be visible in the latitude of the British Isles. |
| R Hydrae. | $13^h 27^m$, | -23° . | Follows γ , and is a deep red variable star of long period. Its brightness ranges from 4th to 10th mag. |



MAPS 11 AND 12.

The Central Hour of R.A. is South at:—

8 p.m. on July 22; 10 p.m. on June 21; Midnight on May 22

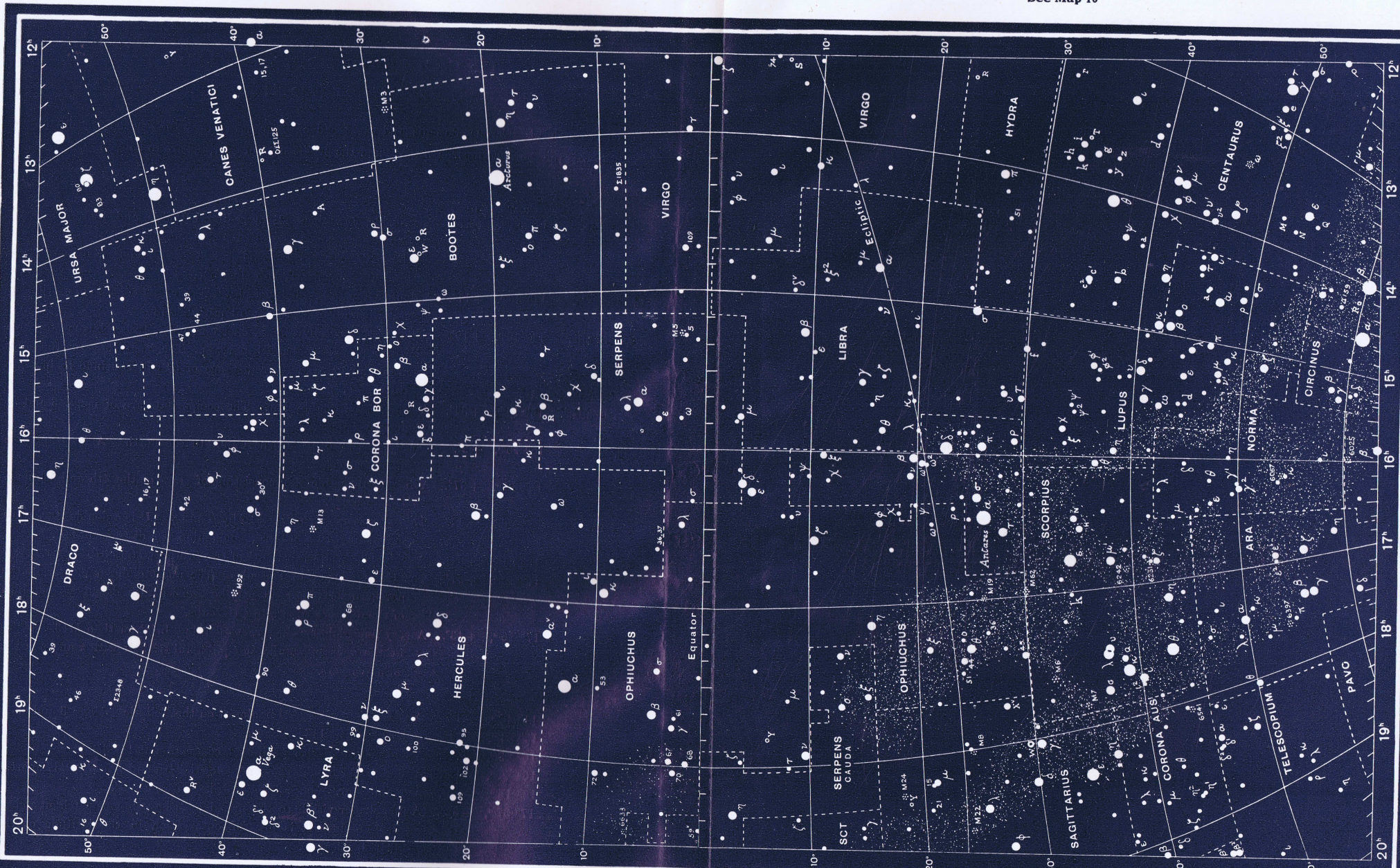
Draco is overhead. Corona Borealis and the Head of Serpens are near the southern meridian, and towards the southern horizon *Antares* and the bright stars of Scorpius are to be seen.

MAP 11.

| | | R.A. | Dec. | |
|----------|-------------------|-----------------------------------|--------|--|
| R | Boötis. | 14 ^h 35 ^m , | + 27°. | A variable star about 2° preceding ϵ Boötis and therefore easily found. It reaches the 6th mag. at maximum, and diminishes to the 12th mag. Its period is 223 days, and it is observable in binoculars for nearly half this time. |
| π | Boötis. | 14 ^h 38 ^m , | + 17°. | A double star and probably a physical pair. It consists of a 5th mag. star with a 6th mag. companion 6" distant. |
| ξ | Boötis. | 14 ^h 49 ^m , | + 19°. | Follows <i>Arcturus</i> by almost $\frac{2}{3}$ of an hour. It is a binary star with a period of about 150 years. The magnitudes of the stars are 5 and 6 $\frac{1}{2}$, and their distance of 5" will continue to increase till 1980 (7"). |
| δ | Boötis. | 15 ^h 14 ^m , | + 34°. | A wide, fixed double star. The components are of mags. 3 and 7 $\frac{1}{2}$ and 105" apart. |
| M5. | | 15 ^h 16 ^m , | + 2°. | Closely precedes 5 of Serpens Caput to the north. A large and fine globular cluster. |
| ζ | Coronae Borealis. | 15 ^h 38 ^m , | + 37°. | A beautiful double star consisting of stars of the 4th and 5th mag. Distance 6 $\frac{1}{2}$ ". |
| κ | Herculis. | 16 ^h 6 ^m , | + 17°. | This star is nearly pointed to by β and γ . It is a double star, a 5th mag. star with a 6th mag. companion at a distance of 30". |
| ν | Coronae. | 16 ^h 21 ^m , | + 34°. | A wide double star consisting of two 5th mag. stars 370" apart. |
| M13. | | 16 ^h 40 ^m , | + 37°. | The Great Cluster in Hercules. The finest globular cluster in the northern heavens. It may be seen with the naked eye one-third of the distance from η to ζ Herculis. |
| M92. | | 17 ^h 16 ^m , | + 43°. | A very fine globular cluster, smaller but brighter than M13. It lies at the apex of an almost equilateral triangle with π and η at the other corners. |

MAP 12.

| | | | | |
|-----------------|----------|-----------------------------------|--------|--|
| α | Librae. | 14 ^h 48 ^m , | - 16°. | A wide double star (231"), almost on the Ecliptic. Mags. 3 and 6. |
| ξ | Lupi. | 15 ^h 54 ^m , | - 34°. | Two 5 $\frac{1}{2}$ stars at 11" distance. |
| β | Scorpii. | 16 ^h 3 ^m , | - 20°. | A 2nd mag. star with a 5th mag. companion at 14" distance. |
| ν | Scorpii. | 16 ^h 9 ^m , | - 19°. | A double star having components of the 4th and 7th mag. 41" apart. |
| σ | Scorpii. | 16 ^h 18 ^m , | - 25°. | A double star. Mags. 3rd and 8th. Distance 20". |
| M6 in Scorpius. | | 17 ^h 37 ^m , | - 32°. | A fine cluster visible to the naked eye as a nebulous patch on a clear dark night. It is low for observation in the latitude of the British Isles. |



MAGNITUDES 1 2 3 4 5 Nebula :: or Cluster

MAPS 13 AND 14.

The Central Hour of R.A. is South at:—
8 p.m. on Sept. 21; 10 p.m. on Aug. 22; Midnight on July 22

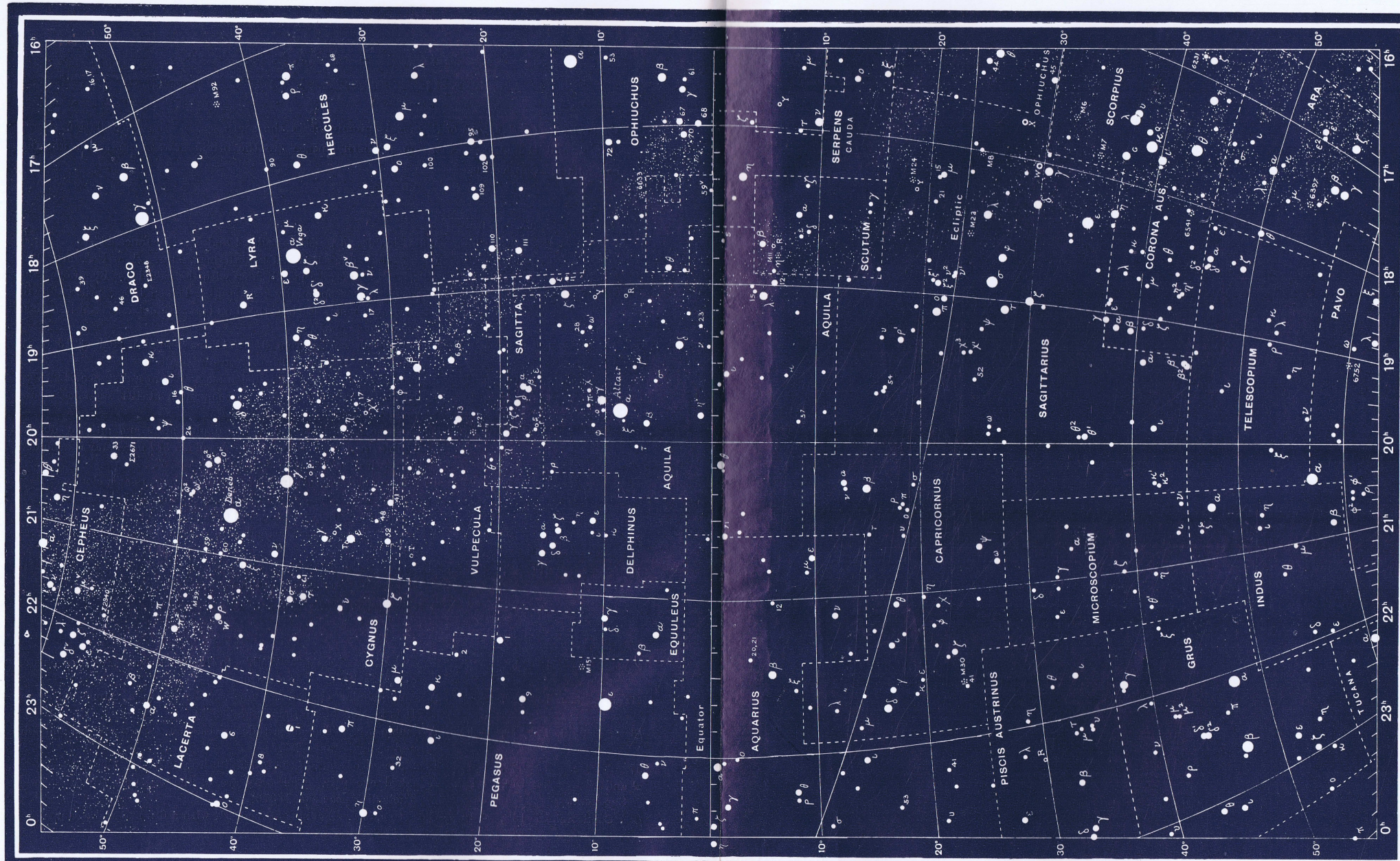
The Great Cross (α , β , δ , γ , ϵ) of Cygnus is prominent in the south, as are the constellations Lyra, Aquila, and Delphinus. Near the southern horizon are the bright stars of Sagittarius and the constellation Capricornus.

MAP 13.

| | R.A. | Dec. | |
|---------------------|-----------------------------------|-------|---|
| ζ Lyrae. | 18 ^h 43 ^m , | +38°. | A fine double star. Magnitudes 4 and 5½. Distance 44". |
| ϵ Lyrae. | 18 ^h 43 ^m , | +40°. | A "double-double" star. Two 5th mag. stars, ϵ^1 and ϵ^2 , are 208" apart, and may be just divided with the naked eye by an observer possessing exceptionally keen sight. The slightest optical aid will separate them. Each of the stars is itself double as seen in a good 2-inch telescope. |
| β Lyrae. | 18 ^h 48 ^m , | +33°. | A star which varies from 3½ to 4½ mag. in a period of 13 days. Three stars of 8th or 9th mag. are in the field. |
| θ Serpentis. | 18 ^h 54 ^m , | +4°. | A double star consisting of two 4th mag. stars at a distance of 22". |
| 6 and 8 Vulpeculae. | 19 ^h 27 ^m , | +25°. | A 4th mag. star with a 6th mag. companion at 404" distance. In a fine field about 3° south of β Cygni. |
| β Cygni. | 19 ^h 29 ^m , | +28°. | One of the most beautiful of the double stars and an easy object, visible in a good binocular. A golden 3rd mag. star is attended by a 5th mag. blue star at a distance of 35". |
| M27. | 19 ^h 57 ^m , | +23°. | The Dumb-bell Nebula in Vulpecula. It appears as a cloudy spot in a small telescope or good binocular. To find it, when south, set the telescope on γ Sagittae, and then raise the telescope by about 3°. |
| γ Delphini. | 20 ^h 44 ^m , | +16°. | A yellow 4th mag. star, attended by a light green 5th mag. star at 10½" distance. |
| 61 Cygni. | 21 ^h 4 ^m , | +38°. | The first double star to have its distance from us measured. Its components are of 5½ and 6th mag., and their distance of 25" is increasing. |

MAP 14.

| | | | |
|---------------------------------------|-----------------------------------|-------|---|
| M8 in Sagittarius. | 18 ^h 1 ^m , | -24°. | The "Lagoon Nebula." Visible to the naked eye. An open cluster of stars with nebulous matter. |
| M11 in Scutum. | 18 ^h 48 ^m , | -6°. | A semi-globular cluster of stars resolvable in a 2-inch telescope. It is just visible to the unaided sight. |
| β^1 Sagittarii. | 19 ^h 19 ^m , | -45°. | A double star. The magnitudes of the components are 4th and 7th, and their distance 28". |
| 57 Aquilae. | 19 ^h 52 ^m , | -8°. | Is composed of stars of the 5th and 6th magnitudes, 36" apart. |
| α^1 and α^2 Capricorni. | 20 ^h 15 ^m , | -13°. | A naked eye pair. The stars are of the 3rd and 4th magnitude. Their distance apart is 376". |
| β Capricorni. | 20 ^h 18 ^m , | -15°. | Close to α , is a yellow star of mag. 2½, with a 6th mag. blue companion at 205" distance. |



MAPS 15 AND 16.

These Maps represent the stars around the South Pole. Those within the declination circle of about 40° S. are always below the horizon, and consequently never visible in the latitude of the British Isles.

About 30° from the South Pole is the well-known constellation of Crux or the Southern Cross. At about the same distance from the South Pole, but on the other side of it, is *Achernar*, the bright star at the end of the River Eridanus.

Roughly equidistant from α Crucis and *Achernar* is the second brightest star in the heavens, *Canopus*.

MAP 15.

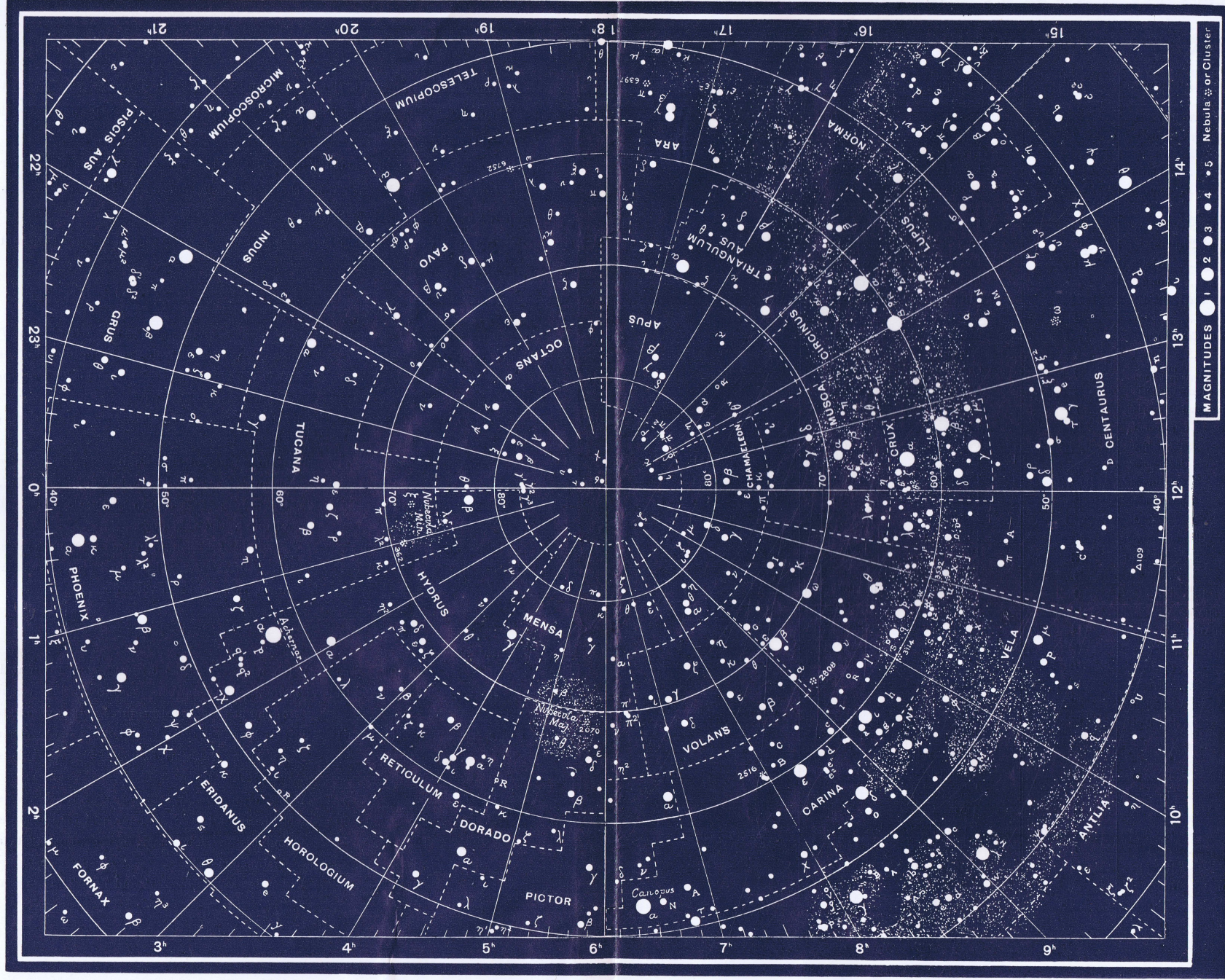
| | R.A. | Dec. | |
|---|---------------|---------------|---|
| δ Tucanae. | $22^h 24^m$, | -65° . | A 5th mag. star with an 8th mag. attendant at $7''$ distance. |
| $\xi=47$ Tucanae. | $0^h 22^m$, | -72° . | A magnificent globular cluster lying near the lesser Magellanic Cloud. It is visible to the naked eye as a hazy 5th mag. star. |
| β Tucanae. | $0^h 29^m$, | -63° . | Two $4\frac{1}{2}$ mag. stars $27''$ apart. |
| ρ Eridani. | $1^h 38^m$, | -56° . | This double star is near <i>Achernar</i> . It consists of two 6th mag. stars $9\frac{1}{2}''$ apart. |
| ϵ Pictoris. | $4^h 50^m$, | -54° . | The components of this double star are relatively fixed. The stars are of mags. $5\frac{1}{2}$ and 6, and their distance $12''$. |
| N.G.C. 2070, 30 Doradus. | $5^h 39^m$, | -69° . | The Great Looped Nebula in Nubecula Major. Bright, and large, and visible to the naked eye. |
| Nubecula Major and Nubecula Minor, the Clouds of Magellan, in appearance resemble detached portions of the Milky Way. They consist of gaseous nebulae and masses of stars, many of them variable. | | | |

MAP 16.

| | | | |
|--------------------|---------------|---------------|---|
| γ Volantis. | $7^h 9^m$, | -70° . | A 4th mag. star with a 6th mag. companion at $14''$ distance. |
| N.G.C. 2516. | $7^h 58^m$, | -61° . | In <i>Carina</i> , near ϵ . A beautiful open cluster containing about 50 stars of the 9th mag. and brighter. It is visible to the naked eye. |
| θ Carinae. | $10^h 41^m$, | -64° . | This 3rd mag. star is attended by many other fainter stars which together form a bright open cluster. This is a beautiful object in a good binocular. |
| γ Crucis. | $12^h 28^m$, | -57° . | A 2nd mag. orange-yellow star with a 7th mag. star $110''$ distant. |
| κ Crucis. | $12^h 51^m$, | -60° . | A beautiful and bright cluster, just visible to the unaided sight. |
| μ Crucis. | $12^h 52^m$, | -57° . | A double star. The mags. of the components are $4\frac{1}{2}$ and $5\frac{1}{2}$. Their distance is $35''$. |
| N Centauri. | $13^h 49^m$, | -53° . | A double star. Mags. $5\frac{1}{2}$ and $7\frac{1}{2}$. The stars are relatively fixed at $18''$ distance. |

MAP 15

See Map 4



See Map 6

See Map 8

See Map 14

See Map 12

MAP 16

See Map 10

INDEX TO THE CONSTELLATIONS.

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|-------------------------------------|-------------------|-------------|-----------------------|---------------------|-------------|
| ANDROMEDA | Andromedæ | 3 | INDUS ... | Indi | 14, 15 |
| ANTLIA ... | Antliæ | 8, 10 | LACERTA ... | Lacertæ | 3 |
| APUS ... | Apodis | 16 | LEO ... | Leonis | 7, 9 |
| AQUARIUS ... | Aquarii | 4, 14 | LEO MINOR | Leonis Minoris | 9 |
| AQUILA ... | Aquilæ | 13, 14 | LEPUS ... | Leporis | 6 |
| ARA ... | Aræ | 12, 16 | LIBRA ... | Libræ | 12 |
| ARGO (See CARINA, VELA, and PUPPIS) | | 8, 10, 16 | LUPUS ... | Lupi | 12 |
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| CAMELOPARDUS | Camelopardi | 1, 2 | MONOCEROS | Monocerotis | 7, 8 |
| CANCER ... | Canceri | 7 | MUSCA ... | Muscæ | 16 |
| CANES VENATICI | Canum Venaticorum | 9 | NORMA ... | Normæ | 12 |
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| CANIS MINOR | Canis Minoris | 7 | OPHIUCHUS | Ophiuchi | 11, 12 |
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| CARINA ... | Carinæ | 8, 16 | PAVO ... | Pavonis | 15 |
| CASSIOPEIA | Cassiopeiæ | 2, 3 | PEGASUS ... | Pegasi | 3 |
| CENTAURUS ... | Centauri | 10, 16 | PERSEUS ... | Persei | 5 |
| CEPHEUS ... | Cephei | 2 | PHOENIX | Phœnicis | 4 |
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| CIRCINUS ... | Circini | 16 | PISCIS AUSTRINUS | Piscis Austrini | 4 |
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| DELPHINUS | Delphini | 13 | SERPENS ... | Serpentis | 11 |
| DORADO ... | Doradus | 15, 16 | SEXTANS | Sextantis | 9, 10 |
| DRACO ... | Draconis | 1, 2 | TAURUS ... | Tauri | 5 |
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| ERIDANUS... | Eridani | 6 | TRIANGULUM | Trianguli | 3 |
| FORNAX ... | Fornacis | 6 | TRIANGULUM AUSTRALE | Trianguli Australis | 16 |
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| HYDRUS ... | Hydri | 15 | VOLANS ... | Volantis | 16 |
| | | | VULPECULA | Vulpeculæ | 13 |

Hints on the Care and Use of Small Telescopes and Binoculars

1. No satisfactory viewing can be accomplished unless the instrument is firmly supported by a steady stand, even of the simplest construction.
2. The object glass and the lenses of the eyepiece should be kept clean. Dust may be removed with a clean camel-hair brush and the lenses then *gently* wiped with a clean old linen handkerchief. Never rub hard.
3. Do not remove the object glass from its metal cell.
4. The dew-caps of binoculars or telescopes should always be drawn out when observing. If the telescope has no dew-cap, a cardboard, or metal tube, blackened inside, should be fitted to the removed cap of the object glass when the telescope is in use.
5. Before bringing the instrument into the house, cover the object glass with its cap. Otherwise the object glass may become dewed.
6. If accidentally dewed, the object glass should be warmed at a safe distance from a fire and then cleaned.
7. Be careful to avoid breathing on the eyepiece when using the telescope.
8. Never venture to look at the Sun direct unless a special very dark glass has been fitted to the eyepiece. Otherwise, an image of the Sun may be safely projected on to a smooth white card held a foot or so from the eyepiece, and looked at from one side.

Star and Cluster Names. Many of these, transliterated or corrupted from the Arabic, have no standard spellings, as Arneb, Arnab; Caph, Chaph; Cebalrai, Kelbalrai; Tarazed, Trazed, &c. a may=e; an=ain; c=k or kh; ei=ie; f=ph; m=n; s=x or z; sh=sch; t=th.

| | | | | | |
|----------------------------------|--------------|---|-------------------------------------|--|-------------|
| <i>Achernar</i> , ā'kér-nār | a Eridani | <i>Cor Scorpii</i> , kór skór-pi-i | <i>Nath</i> , nath' | β Tauri | |
| <i>Acrab</i> , āk'rāb | β Scorpii | (or k. skór-pi-ō'nis) a Scorpii | <i>Nekkar</i> , nēk-kār' | β Bootis | |
| <i>Albireo</i> , āl-bir'ē-ō | β Cygni | <i>Cor Serpentis</i> , kór sér-pén'tis | <i>Okda</i> , ōk'dā | α Piscium | |
| <i>Alcor</i> , āl-kór' | 80 Urs. Maj. | a Serpentis | <i>Pheeda</i> , fēk'dā | γ Urs. Maj. | |
| <i>Alyone</i> , āl-si'ō-nē | η Tauri | <i>Deneb</i> , dēn'ēb a Cygni, β Leonis | <i>Pleiades</i> , pli' or plē-ā-dēz | | |
| <i>Aldebaran</i> , āl-dē'bā-rān | a Tauri | <i>Denebola</i> , dē-nēb'ō-lā β Leonis | <i>Pleione</i> , pli-ō-nē | 28 Tauri | |
| <i>Alderamin</i> , āl-dē-rā'min | a Ceph | <i>Diphda</i> , dīf'dā | β Ceti | <i>Polaris</i> , pō-lā'ris | a Urs. Min. |
| <i>Algiba</i> , āl-jē'bā | γ Leonis | <i>Dubhe</i> , dōōb'hē | a Ur. Maj. | <i>Pollux</i> , pōl'ūks | β Gemini |
| <i>Algenib</i> , āl-jē'nīb | γ Pegasi | <i>Electra</i> , ē-lēk'trā | 17 Tauri | <i>Procyon</i> , prō-si-ōn | (Cluster) |
| <i>Algol</i> , āl-gōl, āl-gōl' | β Persei | <i>Errai</i> , ār-rāi' | γ Cephei | <i>Procopon</i> , prō-si-ōn | a Canis Min |
| <i>Athens</i> , āl-hēn'ā | γ Gemin. | <i>Etamin</i> , ēt-ā-mīn' | γ Draconis | <i>Rulcherima</i> , rūl-kēr'imā | e Bootis |
| <i>Alloth</i> , āl-ōth' | e Urs. Maj. | <i>Pomalhaut</i> , pō-māl-hōt', -māl-ō | | <i>Ras Algethi</i> , rās āl-jē'tē | e Herc. |
| <i>Alkaid</i> , āl-kād' | η " | a Piscis Austrini | | <i>Ras Alhague</i> , rās āl-hā gwē | |
| <i>Almak</i> , āl-māk' | γ Androm. | <i>Gemma</i> , jēm'ā | a Corona Bor. | | a Uphiuchi |
| <i>Alnilam</i> , āl-nī-lām' | e Orionis | <i>Gomeisa</i> , gō-mī-sā' | β Can. Min. | <i>Rastaban</i> , rās-tā-bān' | γ Draconis |
| <i>Alphard</i> , āl-fārd' | a Hydræ | <i>Hamal</i> , hām'al | a Arietis | <i>Regulus</i> , rēg'ū-lūs | a Leonis |
| <i>Alphecca</i> , āl-fēk'ā | a Cor. Bor. | <i>Hyades</i> , hī-ā-dēz (Star Cluster) | | <i>Rigel</i> , rī-gēl, rī-jēl | β Orionis |
| <i>Alpheratz</i> , āl-fēr'āts | ω Androm. | <i>Kaitain</i> , ki-tāin' | a Piscium | <i>Sadalmeik</i> , sād-āl-mēl'ik | a Agr. |
| <i>Alphirk</i> , āl-fūr'k | β Cephei | <i>Kaus Australis</i> , kōs ōs-trā'lis | | <i>Sadalsud</i> , sād-āl-sōōd' | β " |
| <i>Alshain</i> , āl-shā'in | β Aquilæ | | η Sagittarii | <i>Scheat</i> , shē'āt | β Pegasi |
| <i>Althair</i> , āl-tāi' | a " | <i>Kornephoros</i> , kōr-nēf'ō-rūs | | <i>Schedar</i> , shēd'ār | a Cassiop. |
| <i>Alwaid</i> , āl-wā'id | β Draco | | | <i>Shediac</i> , shēl'āk | β Lyre |
| <i>Antares</i> , ān-tā'rēs | a Scorpii | <i>Maia</i> , mā'yā, mī-ā' | β Herculis | <i>Sheratan</i> , shēr-ā-tān' | β Arietis |
| <i>Arcturus</i> , ārk-tū'rūs | a Bootis | <i>Markab</i> , mār-kāb | a Pegasi | <i>Sirius</i> , sir'i-ūs | a Can. Maj. |
| <i>Ariedad</i> , ār-i-ded' | a Cygni | <i>Megrez</i> , mē'grēz | δ Urs. Maj. | <i>Sirrah</i> , sir'ā | a Andromedæ |
| <i>Asterope</i> , ās-tēr'ō-pē | 21 Tauri | <i>Mekab</i> , mē'kāb | a Ceti | <i>Skat</i> , skāt | δ Aquarii |
| <i>Atlas</i> , āt'lās | 27 " | <i>Menkalinan</i> , mēn-kāl-i-nān' | | <i>Spica</i> , spi'kā | a Virginis. |
| <i>Azimelch</i> , āz-i-mēk' | a Virginis | | | <i>Sulaphat</i> , sōō-lā-fāt' | γ Lyre |
| <i>Bellatrix</i> , bē-lā'trīks | γ Orionis | <i>Menkar</i> , kab, mēn-kār | a Ceti | <i>Sulocm</i> , avāl'ō-kin | a Delphini |
| <i>Benetnasch</i> , bē-nēt'nāsh | γ Urs. Maj. | <i>Merak</i> , mēr'āk | β Urs. Maj. | <i>Talitha</i> , tā-lē'tā | ι Ur. Maj. |
| <i>Betelgeuse</i> , bēt-ēl-gūz | a Orionis | <i>Merope</i> , mēr'ō-pē | 23 Tauri | <i>Tarazed</i> , tār-ā-zēd | γ Aquilæ |
| <i>Canopus</i> , kā-nō'pūs | a Argūs | <i>Mesarthim</i> , mēs-ār-tim' | γ Arietis | <i>Taygeta</i> , tā-jē'tā | 19 Tauri |
| <i>Capella</i> , kā-pē'lā | a Aurigæ | <i>Mintaka</i> , mīn'tā-kā | δ Orionis | <i>Thuban</i> , thōō-bān' | a Draconis |
| <i>Caph</i> , kāf | β Cassiop. | <i>Mira</i> , mī'rā | e Ceti | <i>Unukalhay</i> , ū-nūk'al-hā' | a Serp. |
| <i>Castor</i> , kās'tēr, kās'tēr | a Gem. | <i>Mirach</i> , mī'rāk, mēr'āk | β Andr. | <i>Vega</i> , vē'gā | a Lyre |
| <i>Cor Caroli</i> , kōr kār'ō-li | a Ven | <i>Mirfak</i> , mīr'fāk | a Persei | <i>Zuben el Genubi</i> , zōō-bēn' ēl je-nōō'bē | a Libræ |
| <i>Cor Hydra</i> , kōr hī'drē | a Hydræ | <i>Mirzam</i> , mīr'zām | β Can. Maj. | | |
| <i>Cor Leonis</i> , kōr lē-ō'nis | a Leonis | <i>Mizar</i> , mī'zār | β Andromedæ | | |
| | | { Ursæ Majoris, e Bootis } | | | |

The Greek Alphabet. The small letters are on the left, the capitals on the right.

| Letter | Name | Letter | Name | Letter | Name | Letter | Name |
|--------|---------------|--------|--------------|--------|---------------|--------|---------------|
| α | Alpha ... A | η | Eta ... H | ν | Nu ... N | τ | Tau ... T |
| β | Beta ... B | θ | Theta ... Θ | ξ | Xi ... Ξ | υ | Upsilon ... Υ |
| γ | Gamma ... Γ | ι | Iota ... Ι | ο | Omicron ... Ο | φ | Phi ... Φ |
| δ | Delta ... Δ | κ | Kappa ... Κ | π | Pi ... Π | χ | Chi ... Χ |
| ε | Epsilon ... Ε | λ | Lambda ... Λ | ρ | Rho ... Ρ | ψ | Psi ... Ψ |
| ζ | Zeta ... Ζ | μ | Mu ... Μ | σ | Sigma ... Σ | ω | Omega ... Ω |